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Assessing the Value of Professional Coders in Ambulatory Healthcare Systems

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Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
JUN 2002	**Final**	**Jul 2001 - Jul 2002**

4. TITLE AND SUBTITLE
Assessing the Value of Professional Coders in Ambulatory Healthcare Systems

5a. CONTRACT NUMBER
5b. GRANT NUMBER
5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
LTJG Edward William Drish

5d. PROJECT NUMBER
5e. TASK NUMBER
5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Medical Clinic Pearl Harbor 480 Central Avenue Pearl Harbor, Hawaii 96860

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
US Army Medical Department Center and School Bldg 2841 MCCS-HRA (US Army-Baylor Program in HCA) 3151 Scott Road, Suite 1412 Fort Sam Houston, TX 78234-6135

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)
32-02

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
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15. SUBJECT TERMS
Evaluation/Management Codes; coding; coding data quality; AHIMA; AAPC; APC; ADM

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**UU**	**40**	

Acknowledgements

For their assistance throughout this study, sincere appreciation is offered to the following individuals. From Naval Medical Clinic Pearl Harbor: Lieutenant Commander Pamela Hatala, Process Improvement Officer; Lieutenant Jason Longwell, Industrial Hygiene Officer; Maurice Eum, Third-Party Billing and Collection; and Albert Morreira, Computer Specialist. From Tripler Army Medical Center: Jeanne DeCosta, Supervisor, Medical Statistics; Aprilani McIlwraith, Medical Statistics; Emma Thompson, Supervisor of Coding; and Patrice Jackson, Department Head, Patient Records. From Headquarters, Air Mobility Command: Major Robert Valentine, Deputy Director, Primary Care Optimization. From Hawaii Patient Accounting Services, William Shanks, Certified Coder.

Abstract

Information derived from accurate, current, and complete patient encounter data is an invaluable resource for healthcare organizations today. Used to support many critical decision-making processes, organizations must strive to produce the highest-quality encounter data possible. This study examines the value of employing certified professional coders to collect encounter data. A comparison of two coding scenarios was conducted: coding completed by healthcare providers and coding completed by professional coders. Samples of Evaluation and Management codes applied by providers and coders were categorized into frequency distributions and the average standard deviations of these distributions were compared. As much less variation was found among the group of professional coders, it was concluded that they produced more reliable results and, therefore, improved coding data quality. In addition to this comparison, two previous studies that assessed the value of coders in ambulatory healthcare systems are included. These studies indicate that professional coders produce significant improvements in coding data quality.

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Assessing the Value of Professional Coders in Ambulatory Healthcare Systems

Information derived from accurate, current, and complete patient encounter data is an invaluable resource for healthcare organizations today. It is needed to support managed care contracting decisions, to conduct cost-benefit analyses, and to evaluate process improvement initiatives. It is used to enhance provider utilization and productivity, to support clinical and population health research, and to justify and communicate requests for reimbursement. High-quality data is vital to these and numerous other healthcare processes, and the ability to obtain high-quality data is essential to achieving optimum health outcomes.

Conditions Prompting Study

Naval Medical Clinic Pearl Harbor (NMCLPH) Command is comprised of eight ambulatory care facilities located on the islands of Oahu and Kauai, Hawaii. Four are branch clinics that provide a complete range of ambulatory care programs and services, and four are medical annexes that offer fewer services to less populated areas. The Command is staffed with approximately 550 military and civilian healthcare professionals who serve an eligible beneficiary population of over 62,000. Averaging more than 225,000 patient encounters each year, NMCLPH represents the largest free-standing ambulatory care facility in the U.S. Navy.

Each year, NMCLPH collects a vast amount of ambulatory care data. This data is collected by physicians, nurse practitioners, physician assistants, and other providers who are directly responsible for care delivery. Professional coders, individuals who are specially trained and certified in data collection and reporting, are not utilized in any manner. Periodic training on proper coding applications and procedures is provided, but no formal, structured program exists.

For several years, leadership at NMCLPH has explored the option of hiring professional coders. Valid arguments have been presented both for and against this option. Those in favor of hiring coders argue that it is not cost effective to utilize highly skilled and relatively expensive human resources, most notably physicians and nurse practitioners, to perform an essentially administrative function better suited for trained technicians. They feel that the current coding and billing system is complex and continuously changing, and that clinicians should not be expected to stay abreast of this evolving system in addition to their own professional development. Those opposed to hiring coders counter that new and improved computer software makes data collection and reporting remarkably simple and far less time consuming than previous methods. They believe that properly trained and motivated clinicians are as capable as professional coders in data collection, and that, for the amount of clinician time actually saved, it would not be cost effective to hire professional coders. Regardless of which position is taken, all agree that achieving high-quality coding data is the ultimate goal.

A current issue that has focused attention on data quality at NMCLPH is the increasing frequency of coding and billing compliance audits. Traditionally, coding and billing compliance has not been as important for Department of Defense (DoD) healthcare systems as it has been for private organizations. This is likely to change in the near future. It is now common for health insurance carriers to conduct compliance audits of healthcare organizations. The TRICARE Uniform Business Office reports two recent audits of civilian medical centers resulted in refund requests of hundreds of thousands of dollars (TRICARE Management Activity UBO, 2001). In response to these audits, the Veterans Administration (VA) and the DoD conducted internal audits at several of their respective medical treatment facilities (MTF). Many of the findings of these audits matched those of the civilian facilities, and each audit concluded that improper

coding and billing practices were widespread. Common problems included: medical record documentation that did not support Evaluation and Management (E/M) codes assigned; inappropriate use of high-intensity E/M codes, a practice commonly referred to as *up-coding*; documentation that did not support bills submitted; inappropriate use of multiple codes for single encounters; and inappropriate billing of physician extenders as physicians.

Healthcare systems today must comply with many coding and billing regulations, most of which are mandated by the Center for Medicare and Medicaid Services (CMS), formerly the Health Care Financing Administration (HCFA). It is becoming increasingly important for DoD MTFs to comply with these regulations. Currently, DoD MTFs bill Medicare only in special circumstances, e.g., during civilian emergencies, but National Defense Authorization Act legislation significantly expanded the scope of services provided for Medicare-eligible beneficiaries. To receive prompt and full reimbursement for these services, DoD MTFs must conform to CMS standards.

In the future, it is likely that the DoD will be considered an *institutional provider of care* to Medicare, and as such will be subject to Medicare Integrity Program (MIP) audits (Karta Technologies, Inc., 2000). The MIP, created by the Health Insurance Portability and Accountability Act of 1996, is responsible for conducting financial audits and utilization reviews for the purpose of detecting and recovering overpayments due to fraud, waste, and abuse**.** To date, over $9.9 billion in overpayments and associated civil penalties have been collected. It is quite likely that, as more Medicare recipients receive care in DoD MTFs, these facilities will be subject to MIP or other forms of billing and compliance audits.

Study Objective

The objective of this study is to assess the value of employing certified professional coders in ambulatory healthcare systems. This will be achieved by comparing the coding data quality of encounter records coded by providers to encounter records coded by professional coders.

Literature Review

Coding Systems. There are three primary coding systems used to collect and report patient encounter data: the HCFA Common Procedure Coding System (HCPCS); the International Classification of Diseases (ICD); and the Ambulatory Payment Classification (APC) system.

HCFA Common Procedure Coding System. HCPCS is a three-level system used by healthcare providers and medical suppliers to report services, procedures, and supplies. Implemented in 1983, it was designed to meet the operational requirements of Medicare and Medicaid; to facilitate uniform application of CMS policies; to standardize communication among providers and suppliers; and to enhance medical education and research by allowing local, regional, and national utilization comparisons (Seare, 2000).

Level I is comprised of Current Procedural Terminology (CPT) codes, which were developed by and are the property of the American Medical Association (AMA). These five-digit codes are used to describe services performed by healthcare providers. There are six major coding categories: E/M, anesthesia, surgery, radiology, pathology and laboratory, and medicine. These are further divided according to location on the body, the service provided, and the patient's medical condition. Currently, the CPT system is the most widely accepted method of procedure coding (AMA, 2000).

Level I does not contain codes for every medical service available, nor does it contain codes for medical supplies. To overcome these limitations, CMS developed Level II codes, also

known as *national* codes. National codes begin with a single letter, A through V, followed by four numbers. They are categorized by type of service or supply. There are currently more than 2,800 national codes. Occasionally, CPT codes conflict with national codes. When this occurs, national codes take precedence (Morin-Spatz, 1997).

Level I and Level II codes are updated annually. Level III codes are used to describe services, procedures, and supplies not yet approved and listed in Levels I or II. These codes are called *local* codes, as they are assigned and maintained by state Medicaid agencies. Local codes begin with a letter, W through Z, and are completed with four numbers. When used, local codes take precedence over both CPT and national codes. There are currently more than 20,000 local codes used in 40 states.

The use of HCPCS codes is essential for complete and timely reimbursement from Medicare and from most state Medicaid agencies. It also improves billing communication among private entities. By improving an organization's ability to communicate services provided and resources consumed, the application of accurate HCPCS codes can save both time and money.

International Classification of Diseases. The ICD coding system is used to translate written diagnoses into numeric and alphanumeric codes. This system was developed by the World Health Organization (WHO) and originally utilized as a statistics-gathering tool. For centuries, the WHO tracked diseases by individual country, but in 1948, they began to track morbidity and mortality worldwide. Their classification system became the internationally recognized standard. While the system continues to be used to support research, education, and statistics, it is also used today as a means of communicating patient information for reimbursement purposes.

The ICD system has undergone many revisions since 1948. The ninth and most recent revision was published in 1978. The U.S. National Center for Health Statistics modified the

system by including detailed clinical information. Their goal was to create a more accurate patient description than was typically necessary for statistical analyses. Currently, the formal title for the ICD system is the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). Codes are commonly referred to as ICD-9 codes.

To be reimbursed for Medicare claims, healthcare organizations are now required, by law, to use ICD-9 codes. In 1988, Congress passed the Medicare Catastrophic Coverage Act. The act was later repealed, but the mandate to require ICD codes on all physician-submitted Part B claims was maintained. It is also mandatory that codes correlate exactly with encounter documentation, with as much specificity and detail as possible. CMS utilizes software programs that link ICD-9 codes to appropriate services and procedures. These programs automatically reject claims that contain codes that are not justified by the level of care provided or claims that do not include the most specific codes applicable.

Ambulatory Payment Classifications. APCs were actually developed as a result of the Inpatient Prospective Payment System (IPPS). The IPPS was implemented to control the ever-increasing amount Medicare paid for inpatient hospital care. The premise for the IPPS was that patients with similar diagnoses consume similar amounts of hospital resources, so hospitals should be reimbursed for these patients at relatively similar rates. To receive payment under the IPPS, patients are categorized by Diagnosis Related Groups (DRG), which link a predetermined amount of reimbursement to a specific diagnosis.

The IPPS was remarkably successful at reducing Medicare's inpatient expenditures. Unfortunately, this was due largely to hospitals shifting a greater percentage of their inpatient services to an outpatient, non-DRG regulated status (Dominguez, 2001). To address this shift, Congress proposed a prospective payment system for *outpatient* care. Through the Balanced

Budget Act of 1997 (BBA-97), the Outpatient Prospective Payment System (OPPS) was created. The BBA-97 also authorized CMS to create a reimbursement system to be used with the OPPS. The first version of this new reimbursement method was the Ambulatory Patient Group (APG) system. This system was modified to become Ambulatory Payment Classifications (APC). The systems are similar in concept – that patients with similar conditions will consume similar hospital resources – but are quite different in other aspects. Many states and several insurance carriers adopted the APG system for Medicaid program reimbursement and continue to use it today. It is important for healthcare providers to know that the two systems will likely continue to coexist (QuadraMed, 2001).

APCs are similar to the DRG model in that outpatient services within a specific group are comparable clinically and with respect to the amount of resources consumed; APCs in the OPPS are equivalent to DRGs in the IPPS. APCs are created by combining HCPCS codes. There are currently more than 5,800 HCPCS codes identified for outpatient payments. These codes have been bundled into approximately 451 APCs (ACEP, 2001). To receive prompt, complete reimbursement, civilian facilities are now required to use APCs to document services provided and resources consumed (Chyna, 2001).

In conjunction with several other cost reduction measures, the OPPS is expected to save $6.6 billion from 1998 to 2003 (Policy & Practice, 2001). Although the use of APCs is not currently mandated in DoD healthcare systems, it inevitably will be.

Coding Software. There is a variety of data collection and reporting software available today. The system utilized in almost all DoD facilities originated from a system implemented in 1996, the Ambulatory Data System (ADS).

Ambulatory Data System. ADS was designed specifically to collect detailed outpatient data from DoD MTFs. Information derived from this data was considered essential for future decisions regarding managed care contracting, population-based healthcare, disease management, clinical pathways, and wellness and preventive medicine initiatives (Karta Technologies, Inc., 2000). Ultimately, the information would allow the DoD to determine the most cost-effective manner of healthcare delivery (CHCS II, 1999). Although ADS was implemented to be a powerful data-gathering tool, it was intended to serve only as an interim system until a more comprehensive method of data collection could be developed and deployed (Gardner, 1999).

The original version of ADS required a bubble sheet, scanner, and printer. Bubble sheets containing patient information were printed before an appointment. After the appointment, a clinician would manually enter all ICD-9, CPT, and E/M codes onto the bubble sheet. The bubble sheet was electronically scanned into ADS and the encounter data was transferred to and stored within the Composite Health Care System (CHCS) database.

Several significant problems arose with ADS. The bubble sheets were cumbersome, the scanners frequently malfunctioned, and considerable amounts of data were lost due to incomplete or improperly scanned bubble sheets. One study at Brooke Army Medical Center found that, in a clinic that processed four to six thousand bubble sheets per month, six to eight hundred contained errors that required resubmission of forms (PASBA, 1999). Overall, ADS was considered costly and inefficient. The system developed to overcome these problems was GT-ADS.

GT-ADS, KG-ADS, and Ambulatory Data Module. GT-ADS is a software system developed at Tripler Army Medical Center (TAMC). The system was modified by the Tri-Service Medical

System Support Center to become KG-ADS. This modification was necessary so that it could be used throughout DoD MTFs. KG-ADS is now utilized in almost all DoD facilities throughout the world. TAMC continues to use the original GT-ADS, and several Navy and Air Force facilities use locally developed, proprietary systems. Eventually, however, all DoD data collection systems will be standardized with the Ambulatory Data Module (ADM), which will be housed in the next version of CHCS, CHCS II.

These electronic versions of ADS replaced the bubble sheet, scanner, and printer with a computer and monitor. With GT- and KG-ADS, clinicians visualize on a monitor all information previously contained on ADS bubble sheets. After a patient encounter, clinicians input all coding data using a keyboard and mouse. As with the original version of ADS, this data is ultimately stored within CHCS.

GT- and KG-ADS were remarkable improvements over ADS. Coding errors were dramatically reduced and considerable time was saved. During pilot testing of KG-ADS, providers reported that the average time required to enter patient encounter data was decreased from several minutes to between 30 and 60 seconds (PASBA, 1999). Although most providers welcomed these innovative systems, a small number resisted their implementation. The two most common reasons cited were a lack of computer training and experience and the long-held belief that administrative personnel, not clinicians, should perform these types of tasks (PASBA, 1999).

Professional Coder Organizations and Levels of Certification. There are two nationally recognized credentialing organizations for professional coders; the American Academy of Professional Coders (AAPC) and the American Health Information Management Association

(AHIMA). Certification by either organization is not mandatory for employment as a coder, but it does serve to validate advanced knowledge and training in the coding field.

American Academy of Professional Coders. The mission of the AAPC it to establish and maintain professional, ethical, and educational standards for professional coders; to provide a means for national certification and credentialing; to support its members by providing educational products and networking opportunities; and to encourage national recognition and awareness of professional coding. The organization is supported by the National Advisory Board, which is comprised of certified members representing clinics, hospitals, payers, and consulting firms. The Board offers direct input into the certification programs, educational curricula, and membership services, and provides professional insight and guidance from physicians working in many different specialties. AAPC-certified coders are employed throughout the United States and several foreign countries (AAPC, 2001).

To address differences between coding for physician services and coding for outpatient facility services, the AAPC offers two types of certification, Certified Professional Coder (CPC) and Certified Professional Coder–Hospital (CPC-H). CPCs are most effective in settings where reimbursement is made directly to physicians, whereas CPC-Hs are better suited where reimbursement is made to facilities. To be certified as either, applicants must pass a written examination that tests knowledge of medical terminology, human anatomy, all levels of HCPCS and ICD-9 coding, and certificate-specific areas, such as surgical and anesthesia coding for CPCs and claims form processing for CPC-Hs. Applicants must also have a minimum of two years field experience. Those who pass the examination but lack occupational experience are designated as a*pprentice* coders (CPC-A or CPC-H-A). After two years, apprentice coders may apply to the academy to become fully certified.

To ensure professional growth and development, AAPC coders must maintain certification by completing continuing education units (CEU). Apprentice coders must complete nine CEUs per year; certified coders must complete 18; and dual-certified coders must complete 24.

In addition to collecting and reporting patient encounter data, CPCs perform a number of other functions within an organization. These include: conducting internal audits to ensure compliance with payer reimbursement policies and federal regulations; providing coding and compliance training to staff members; updating data collection and reporting forms in response to coding changes; updating fee schedules after annual Relative Value Unit reviews; and, when necessary, evaluating and appealing denied claims.

Many CPC-H duties mirror those of CPCs. Several additional responsibilities unique to CPC-Hs include: accurately coding outpatient diagnoses by applying the American Hospitals Association's Coding Clinic guidelines and ICD-9 codes; possessing a working knowledge of APCs; reviewing acuity forms to ensure proper application of E/M services; and understanding all aspects of preparing and submitting claim reimbursement forms.

American Health Information Management Association. In 1928, the American College of Surgeons established the Association of Record Librarians of North America. To better reflect the true composition of its members, the name was changed in 1938 to the American Association of Medical Record Librarians. In 1970, it became the American Medical Record Association, and finally, in 1991, the American Health Information Management Association (AHIMA).

Throughout its history, AHIMA has adapted to the evolving healthcare industry and, in particular, to the industry's growing reliance on clinical data. While their original goal, "to elevate the standards of clinical records in hospitals and other medical institutions," still serves as the foundation for the organization, their current mission has expanded the scope of healthcare

data “beyond the single hospital medical record to health information comprising the entire continuum of care” (AHIMA, 2001, p. 1).

AHIMA offers four certifications: Registered Health Information Technician (RHIT); Registered Health Information Administrator (RHIA); Certified Coding Specialist (CCS); and Certified Coding Specialist–Physician-based (CCS-P). Similar to the AACP, AHIMA requires its coders maintain professional development by completing CEUs. In addition, however, AHIMA coders must complete annual self-assessments to identify professional strengths and weaknesses. These self-assessments are comprised of multiple choice questions and medical record coding scenarios.

RHITs are trained to verify completeness and accuracy of health record data and to properly enter data into computer databases. They use computer programs to compile and analyze data for research, utilization management, budgeting decisions, and reimbursement. While most RHITs work in hospitals, some are employed in outpatient settings, such as office-based physician practices, nursing homes, home health organizations, and public health agencies (AHIMA, 2001).

In addition to data collection, analysis, and reporting, RHIAs are trained to be healthcare managers. Utilizing encounter data in decision-making processes, they interact closely with clinical, financial, and administrative departments. Historically, RHIAs served as directors of health information management departments. Today, however, the continued transition to computerization and the growing need for health data are allowing RHIAs to serve in more diverse roles, such as information security, data transfer and storage, data quality assurance, and advanced consumer-oriented health information.

A CCS is trained to analyze and classify medical data obtained from patient records. Most often employed in inpatient settings, these coding professionals possess a thorough understanding of all forms of diagnosis, service, and procedure coding and are knowledgeable in medical terminology, pharmacology, and disease processes. CCS-Ps receive training similar to CCSs, but from an outpatient perspective. They play a more direct role in receiving reimbursement from insurance companies, government agencies, and other payers, and are most effective in physician-based settings, such as group practices, multi-specialty clinics, and specialty centers (AHIMA, 2001).

Previous Studies of Coding Data Quality. Two studies which examine coding data quality and the impact of certified professional coders on achieving high-quality data are included here. The size and scope of these studies vary significantly, but the results of each are relevant to this study and to coding processes at NMCLPH. The two studies, one conducted by the Office of the Surgeon General, Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois, and the other by the a four-physician Family Practice Group in Waianae, Hawaii, will now be described and results presented.

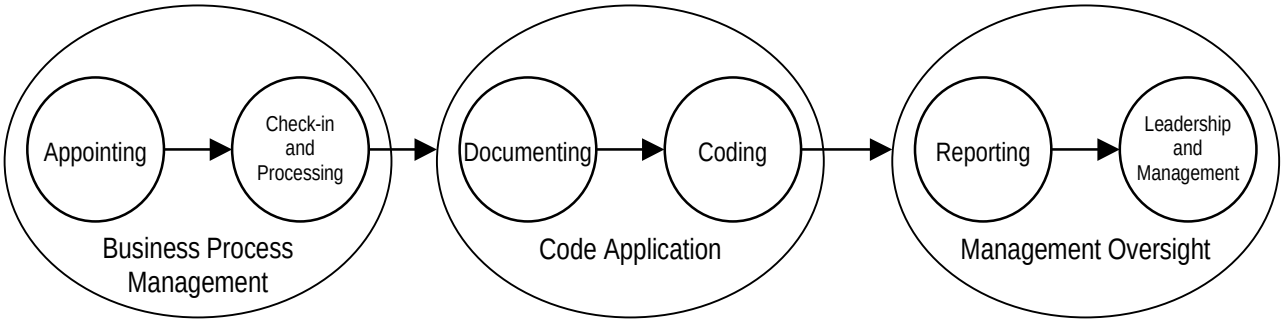
Karta Technologies, Incorporated. Karta Technologies was contracted by the Office of the Surgeon General to conduct a comprehensive study of coding data quality at several AMC ambulatory care facilities. There were two objectives in their study. First, to evaluate coding data quality under three scenarios: coding completed by certified professional coders; coding completed by non-certified technicians; and coding completed by physicians. Second, to determine which of the above methodologies, or combination of methodologies, produced the greatest value to the AMC.

Karta Methods and Procedures. The AMC selected three MTFs to represent each coding scenario: David Grant Medical Center at Travis AFB (Travis), Michael O'Callahan Federal Hospital at Nellis AFB (Nellis), and Charleston AFB Clinic (Charleston). These MTFs ranged in size and complexity, from a major teaching hospital to a small clinic, respectively. To ensure comparability, only data from each facility's Family Practice Clinic (FPC) were considered. Study samples were comprised of 100 randomly selected encounter records from each FPC. Three additional 100-record cohort samples were taken from FPCs in civilian facilities similar to Travis, Nellis, and Charleston. The study was conducted from September 1, 1999, to August 31, 2000.

To evaluate coding data quality, Karta developed a plan to assess three specific components: timeliness and completeness, accuracy, and compliance. Timeliness and completeness measured a facility's success at submitting a coded ADS record for every encounter documented in CHCS; accuracy measured how closely what was coded reflected actual documentation in the encounter record; and compliance measured the amount of up-coding present at each facility.

To determine which methodology produced the greatest value to the AMC, Karta completed a business case analysis that evaluated entire coding processes at each MTF. They began by creating a coding process model that identified significant sub-processes in data collection. The sub-processes identified were: appointing; check-in and processing; documenting; coding; reporting; and leadership environment/management oversight. These sub-processes were grouped into three primary functions: business process management; code application; and management oversight. A diagram of the Karta business model is shown in Figure 1.

Figure 1. Karta coding process model identifying key functions and sub-processes.



These sub-processes and the overall coding process were analyzed and evaluated for compliance with widely accepted management principles. Gaps in process and control elements were identified. In addition to this gap analysis, Karta searched for DoD policies, guidelines, and automation that could be used to improve the coding process. They also researched relevant legal, regulatory, and legislative initiatives that might affect the current and future coding environment.

The first objective of the study was to evaluate coding data quality produced by three different methodologies: professional coding (Travis); technician coding (Nellis); and provider coding (Charleston). As the study began, however, Karta discovered that only *two* methods were actually in use: Travis utilized professional coders, but both Nellis and Charleston used variations of provider coding. Providers at Nellis entered data onto paper *superbills*, which were later transferred into CHCS by technicians, and clinicians at Charleston entered data directly into CHCS via KG-ADS. This situation resulted in Karta comparing only two methodologies, professional coding and provider coding.

To evaluate records from each facility, Karta subcontracted a team of professional coders from 3M Health Information Systems (3M HIS). This team performed on-site abstracting of

encounter data at each MTF. They scored data quality utilizing approved audit worksheets and DoD coding guidelines. The lead coder on the team possessed 22 years of coding experience and, at the time of the study, was serving as president of the AAPC.

Timeliness and completeness was assessed by correlating CHCS and ADS data records. Each CHCS record must have a corresponding ADS record. Encounters missing from the ADS database were not considered work completed and, therefore, equated to resources wasted. The 3M HIS team developed an average facility-specific FPC bill, and by multiplying this average bill by the number of missing ADS records, timeliness and completeness was translated into a dollar value.

To help quantify results and to illustrate the dollar-value impact of accuracy, the coding team applied Medicare reimbursement rates to each encounter record. Similar to the method used to determine the dollar value for timeliness and completeness, an ideal CMS-compliant claim was created. Coded records from the three AMC facilities were compared to the ideal CMS-compliant claim. The difference between these two values represented dollars lost due to inaccurate coding.

Compliance assessed each MTFs CMS non-compliant rates, focusing primarily upon up-coding. Determination of compliance was found in the same manner as accuracy, but was calculated in percentages rather than dollars. The importance of assessing the amount of up-coding is linked to billing and compliance audits and the potential penalties associated with deficiencies discovered during these audits.

Karta Results and Recommendations. For timeliness and completeness, Karta determined that, on average, the three FPCs were not recognizing 8.4% of coded encounter records (Travis – 17.3%, Nellis – 3.4%, Charleston – 1.4%). By multiplying these percentages by the average

facility specific FPC bill, Karta estimated that the annual lost revenue was $781,786. In their formal report, Karta emphasized the affect of unrecognized encounter records on AMC resources:

> *Longer term, the failure to code and report these encounters will undoubtedly impact the "TRICARE for Life" Program. Although the exact mechanism for DoD reimbursement from HCFA under the legislation is unknown at this point, it can be predicted with great certainty that failure to recognize legitimate resource expenditures can only hurt the AMC. Unlike inaccurate coding, however, failure to submit data (claims) does not present a danger from HFCA MIP audits – if the institution opts not to submit claims data it does so to its own detriment. HCFA's primary concern is that it is not over charged.*

Due to limitations in comparability, Karta did not utilize data from the civilian cohort samples in evaluating timeliness and completeness. They maintain, however, that the financial impact of poor compliance is a significant incentive for private organizations, and that 99% compliance is considered an acceptable performance standard in private practices.

Regarding accuracy, Karta discovered significant differences between facility coding and ideal coding in all three FPCs. On average, accuracy for the AMC facilities was 79% (Travis – 83%, Nellis – 80%, Charleston – 73%). This equated to $60,162 in lost revenue. Accuracy in the civilian cohort facilities also averaged 79%.

Average compliance in the AMC facilities was 79%. Compliance in the civilian facilities, however, averaged 91%. Karta concluded that this was due to a strong desire to avoid compliance audits.

Overall, Karta concluded that poor coding data quality in all three FPCs resulted in a 24% negative impact on AMC medical resources. Essentially, one-quarter of their work was either missing, incorrectly coded, or up-coded. Of the three MTFs, however, Karta determined that Travis produced the best coding data quality. They attributed this primarily to employing coders to collect encounter data. They reported, "Combining all possible performance indicators, there is simply no reasonable doubt that employing dedicated, full-time coders to apply ICD, CPT, and E/M codes yields the best possible outcomes" (Karta, 2000, p. 58).

From the gap analysis, Karta discovered several trends that negatively impacted coding processes and data quality. These trends and their descriptions are listed in Table 1.

Table 1. Karta study gap analysis.

Trend	Description
Role confusion due to organizational change	Recent optimization efforts resulted in significant organizational changes; most significant confusion among administrative staff and management attempting to define new roles and resolve often-contradictory expectations
Lack of responsibility for coding process oversight	With few exceptions, failed to find any individual at any level assigned with responsibility for coding process
Lack of defect analysis	Although significant problems were widely suspected and generally acknowledged, little to no quality inspection was conducted; few attempts were made at process improvement
Lack of education and training	No facility had an organized, problem-focused, or ongoing education and training program

Karta recommended that the AMC should adopt a hybrid model to achieve the highest quality of coding data at the most reasonable cost of all alternatives. Highly skilled, expert coders should manage the most complex, error-prone encounters. These coders should also provide training and guidance to clinicians and other support staff responsible for managing less complex encounters. Key components to Karta's strategy include: employ at least one professional coder at each MTF; conduct initial and recurring training in code compliant documentation and code application to clinicians and support staff; and utilize professionally prepared charge-masters at all facilities.

Hawaii Patient Accounting Services. In June 2001, Hawaii Patient Accounting Services (HPAS) was contracted to evaluate coding data quality at a four-physician FPC in Waianae, Hawaii. The physicians in the practice were directly responsible for coding, compiling, and reporting all encounter data. They were considering hiring a professional coder to assume these responsibilities and asked HPAS to evaluate their coding data quality to assist them in their decision-making process.

HPAS Methods and Procedures. HPAS chose to conduct a retrospective study that would evaluate physician-coded encounter records by measuring them against an *ideal* coding standard. This ideal standard was created with criteria abstracted directly from the nationally recognized CPT reference manual, *Code It Right*. A team of professional coders applied this standard to a sample of records and compared these results to those previously obtained by the physicians. Validity was achieved by utilizing criteria abstracted from a formally recognized coding reference. Reliability was achieved by applying these criteria consistently across all records in the study sample.

The professional coders conducting the study were employees of HPAS. To eliminate conflict of interest, HPAS contracted an independent coding and billing auditing agency to review random samples of their findings. This agency concluded that the ideal standard developed by HPAS was appropriate for its intended purpose, that it was applied uniformly throughout the sample, and that there was no statistically significant variation among the coders.

HPAS also considered the patient case-mix and workload of each physician. The results of their study would be meaningless if a physician primarily treating simple, acute upper respiratory tract infections was compared to a physician treating mostly complicated, chronic hypertension. Results would also be misleading if there was considerable variation in the number of patients treated by each provider. After researching both possibilities, HPAS concluded neither was evident. Case-mix was similar among all four physicians and all treated approximately the same number of patients.

To determine an appropriate duration for the study, HPAS reviewed historical workload data. No notable seasonal fluctuation was noted and a two-month period, from February 20 to April 20, 2001, was determined to be sufficient. The study sample was comprised of all established-patient records for this period. Ultimately, a three-person team of HPAS coders audited approximately 3,000 encounter records. Coders randomly selected and scored the physician-coded records. After scoring each record against the ideal coding template, they determined the most appropriate E/M code for each encounter.

HPAS results and Recommendations. Results of records coded by physicians and by HPAS coders are shown in Figures 2 and 3, respectively. The difference between the two groups is emphasized when these results are displayed in a line chart, shown in Figure 4.

Figure 2. Encounter records coded by four FPC physicians.

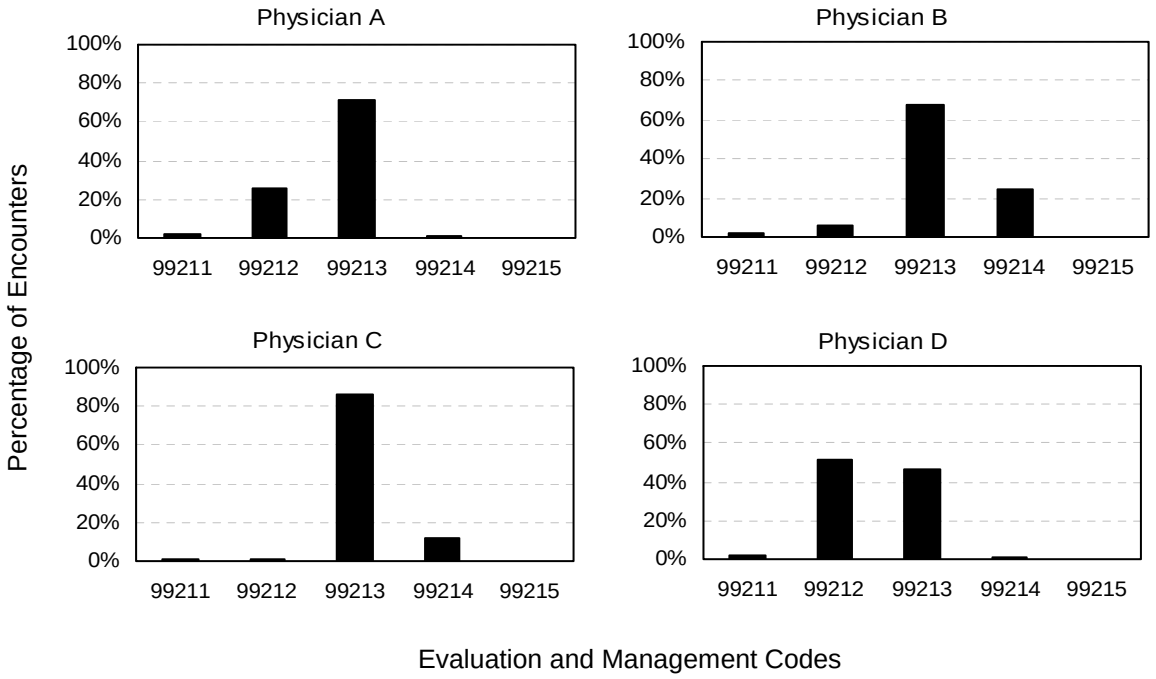


Figure 3. Records from the above four physicians re-coded by certified professional coders.

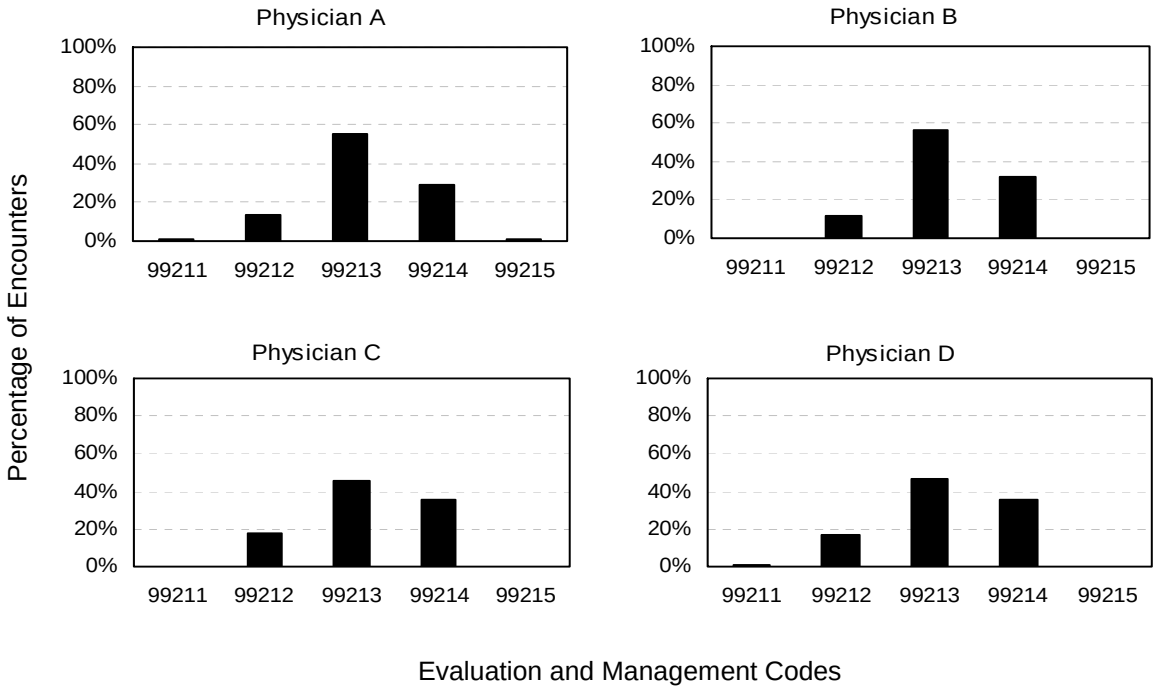
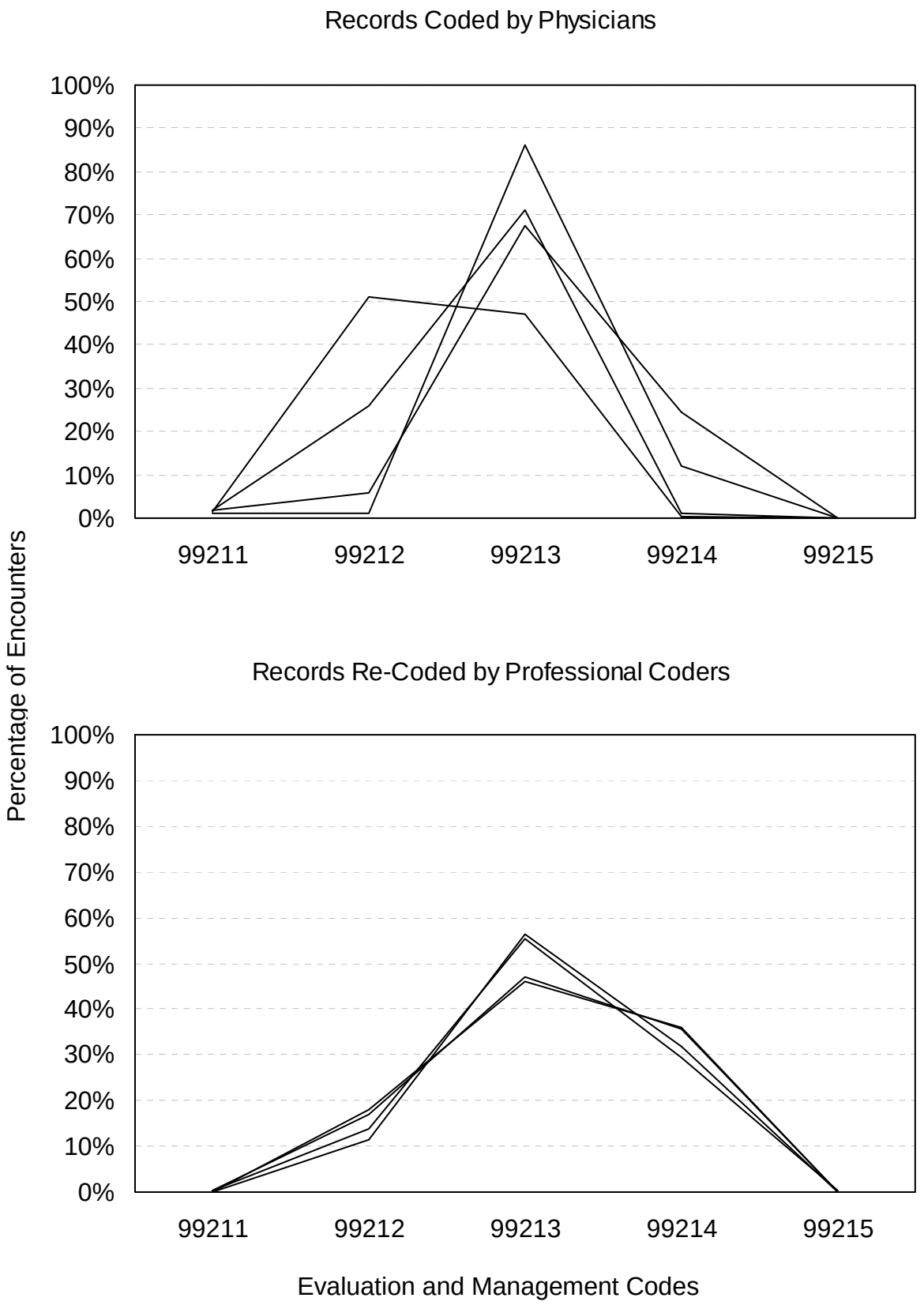


Figure 4. Records coded by four FPC physicians and recoded by certified professional coders.



The frequency distributions in Figure 2 indicate considerable variation between the four physicians. Those in Figure 3, however, indicate greater consistency among the professional coders. Further statistical analyses were not conducted. HPAS presented their findings to the physicians, who accepted them as convincing evidence of poor coding data quality at their clinic. HPAS recommended that the physicians should either attend comprehensive training on coding methodologies and procedures or hire a professional coder to assume an active roll in data collection and reporting.

Purpose

Null and Alternate Hypotheses. Although a detailed statistical analysis was not necessary in this study, it is still important to clearly identify the null and alternate hypothesis. The null hypothesis is that there is no significant variation in coding data quality between providers and certified professional coders. The alternate hypothesis is that there is a significant variation between these two groups.

Dependent and Independent Variables. The dependent variable is the quality of the data coding as measured by the degree of variability among coders. The independent variable is type of coder, i.e., provider or professional coder.

Other Factors Influencing the Quality of Data Coding. It is believed that the following factors also impact the quality of data coding: the education and training of providers, the motivation of providers to accurately collect and record encounter data, and the computer software utilized to collect data.

It is reasonable to assume that certified coders possess an advanced level of education and training in coding applications and procedures. This, however, is not a reasonable assumption with regard to providers. Many providers interviewed stated that they had little or no coding

training. The lack of training would most likely have a negative impact on the accuracy of the coded data. There also appeared to be a pervasive lack of understanding, on the part of the providers, for the need to accurately and completely code data in order to improve the clinical and managerial decision making process. Accurate and complete data is vitally important to effective healthcare delivery as resource allocation decisions are often made based on this data, but this is not a well-known fact among providers.

Being a subjective quality, motivation can be difficult to measure. The impact of motivation, on the other hand, can be objectively assessed. After reviewing preliminary study data, it appeared that some providers were not motivated to apply correct E/M codes. For example, it is extremely unlikely that a provider will treat 100 patients and apply the identical E/M code to each patient, especially if that code indicates a detailed patient history, a detailed physical examination, and a moderately complex medical decision-making process. The more likely scenario in this case is that the clinician selects a specific E/M code as a *default* code and does not exert the time or effort to identify and apply the correct code. When this occurs, it is also necessary to question other areas of coding, such as ICD-9 and CPT.

The computer software variable is associated to some degree with both of the above. Providers who are not well trained in the use of current data-collection software will most assuredly be less effective in effective data collection than those who are adequately trained. These providers may also be less motivated due to frustration with the system. It is interesting to note that several providers who voiced strong support for hiring professional coders also expressed frustration and dissatisfaction with data-collection software, particularly KG-ADS.

The impact of each of these major variables on coding data quality is worthy of independent study. Unfortunately, evaluating the impact of each is beyond the scope of this project.

Methods and Procedures

Study Site and Design. In January 2001, the Urology Department at TAMC began a pilot program to shift coding responsibilities from providers to professional coders. This created an excellent opportunity to compare the coding data quality produced by each.

The transition from providers to coders was conducted in two phases. First, from January to May 2001, only records for VA patients were reviewed and coded by professional coders. These records equaled approximately 15% of the patient workload. Then, beginning in May 2001, all records were reviewed and coded by coders.

Data Collection. To obtain an appropriate study sample, records for six months before the transition began and six months after the transition was complete were considered. The sample was comprised of all established-patient encounter records from July 2000 through October 2001. As the VA records for the four-month period from January through April represented such a small percentage of the overall patient workload, they were excluded from the sample.

Coding data were extracted from CHCS. Initially, records from 23 providers were considered. To ensure a valid comparison, however, only providers with relatively stable workloads throughout the entire study period were included. Because several individuals transferred during the study, and because the number of records produced by some providers varied significantly, only records from four providers were ultimately included in the sample. The sample size from these four was 1,910 records.

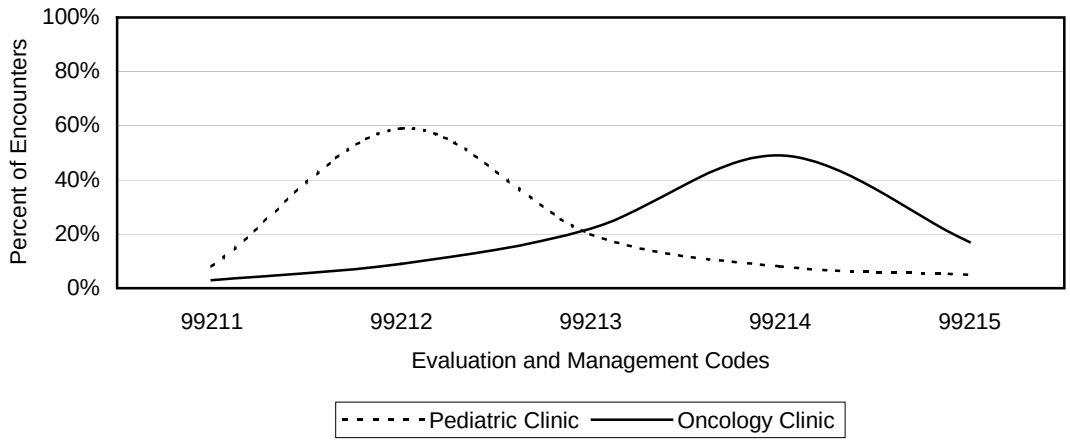
Validity and Reliability. As in the HPAS study, TAMC coders developed and adopted a coding standard utilizing criteria from *Code It Right*. The standardized criteria were based on professionally accepted criteria and may therefore be considered valid for the purposes of this study. Reliability was assessed subjectively by reviewing the consistency with which the

certified coders recorded the data. The higher the degree of consistency among the certified coders, the higher the reliability. By averaging the standard deviations (SD) of all E/M code categories in each sample, the overall variation from the ideal characteristic curve was determined. Over time, the distribution of records in a clinic should fall on or near the ideal characteristic curve for that clinic. The assumption is that, all other factors being equal, clinicians treating a relatively similar mix of patients in a particular clinic should apply relatively similar codes.

Method of Analysis. The method of analysis selected for this study was to calculate and compare the average standard deviation (ASD) of each group of records. Standard deviation, the most commonly used measure of variability, is the degree of "spread" in the values of a particular study variable; the more dispersed, or the greater the spread of the values relative to the sample mean, the greater the SD. In a typical bell-shaped distribution, 68 % of scores fall within +/– 1 SD of the mean, 95 % fall within 2 SDs, and 99 % fall within 3 SDs (Munro, 1997). E/M codes applied by each group were categorized into frequency distributions. These distributions, which are actually sub-samples within the overall study sample, created normal, bell-shaped curves. This facilitated comparison of their SDs.

While the sub-sample distributions form normal curves, the calculated SDs for the overall samples do not. Instead, these form curves characteristic to a specific type of healthcare service. For example, a sample of established-patient encounter records from an oncology clinic will likely contain more high-intensity codes than a sample of records from a pediatric clinic. As illustrated in Figure 6, the characteristic curve for the oncology clinic will appear negatively skewed, while the characteristic curve for the pediatric clinic will appear positively skewed. The creation of this characteristic curve is the essence of comparing the ASDs of providers to coders.

Figure 6. Examples of characteristic curves from different healthcare services.



A study by RPG Diffusion Systems applies the comparison of ASDs in a similar manner. The objective of their study was to develop the optimum acoustic design for stage canopies. Using a 2-kHz sound source transmitted from various locations on a stage, thousands of canopy shapes were tested to determine which produced the lowest ASD in decibels of scattered sound (RPG Diffusor Systems, 2002). While the objective and design of the canopy study is quite different from this coding study, the practical application of ASDs is identical.

Ethical Considerations. No significant ethical considerations were present in this study. Providers' names were only used during initial research and data collection; coders' names were not necessary at any point, nor were any unique patient-identifying data.

Results. Frequency distributions from TAMC providers and coders are illustrated in Figures 7 and 8, respectively. Line charts are displayed in Figure 9, and ASDs in Figure 10. The degree of consistency among the certified coders is striking when compared to the variability noted among the providers (compare Figures 9 and 10). The observed consistency provides strong evidence that certified coders produce more reliable results than non-trained physicians, and, therefore, improve coding data quality.

Figure 7. Encounter records coded by four TAMC providers.

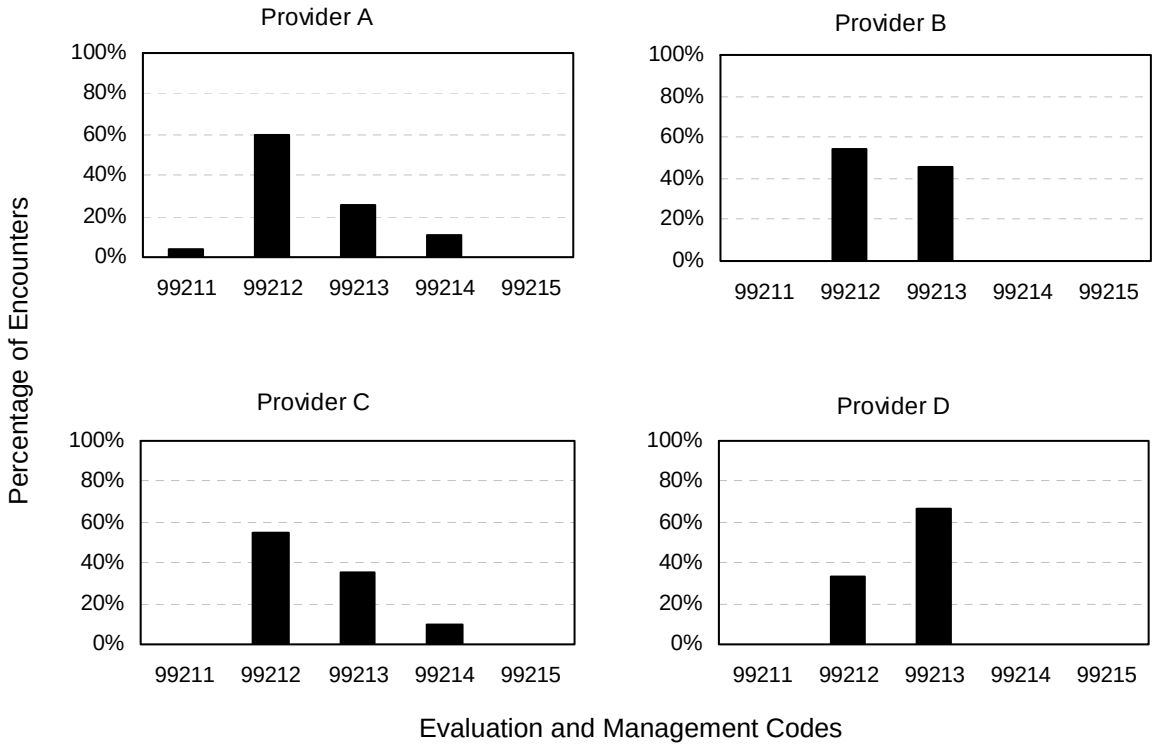


Figure 8. Encounter records from the above four providers coded by TAMC coders.

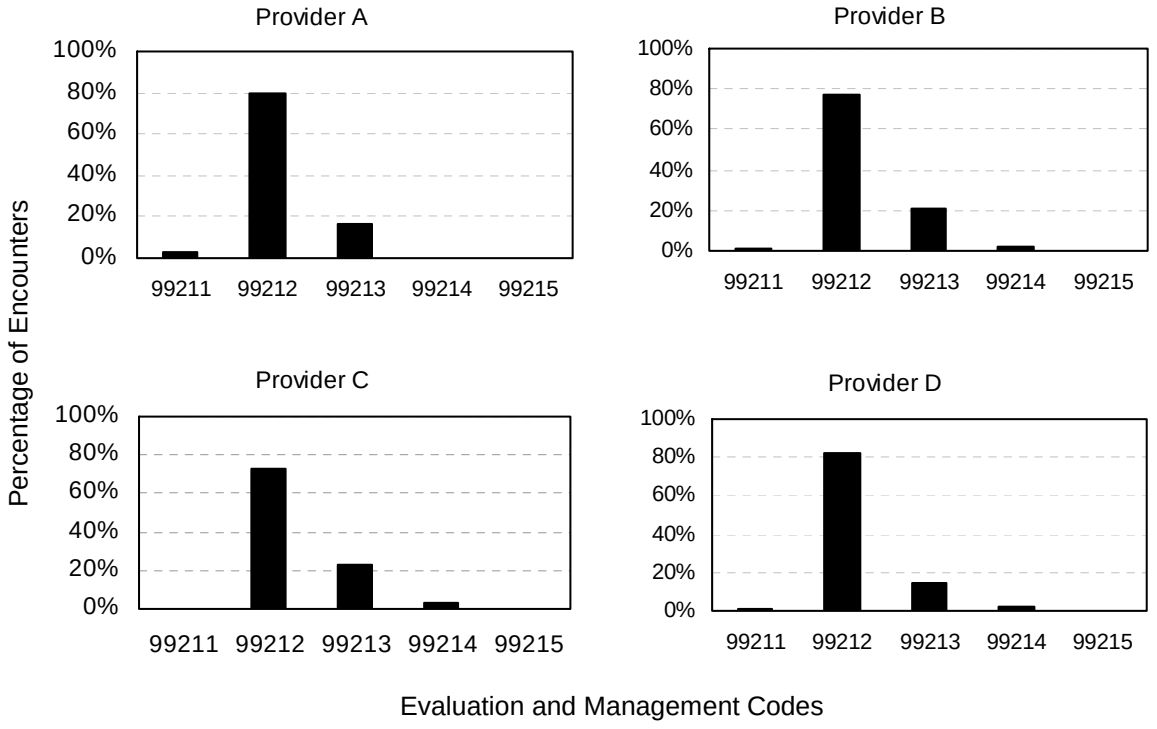


Figure 9. Records coded by four TAMC providers and TAMC certified professional coders.

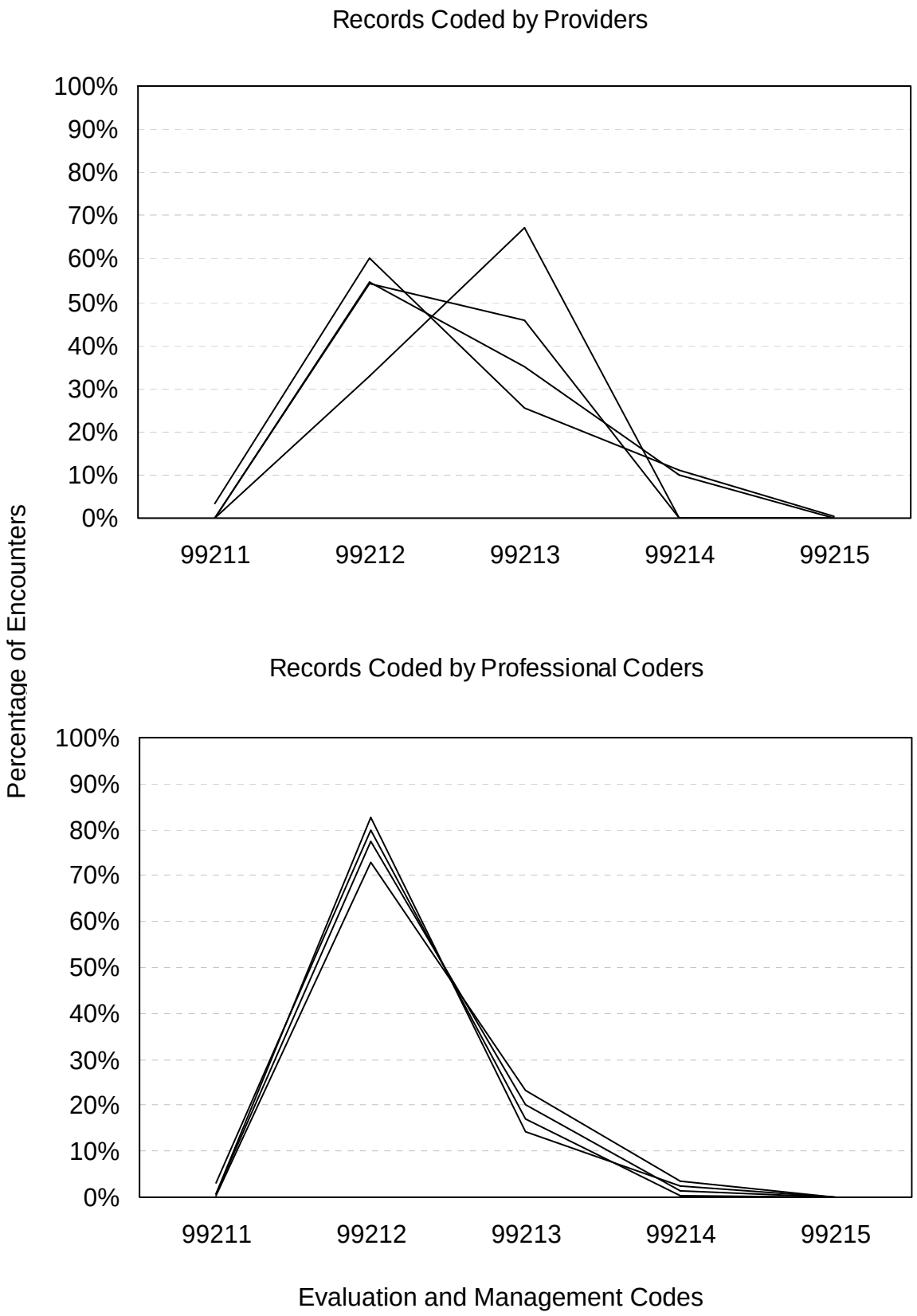


Figure 10. Comparison of the ASD of results from TAMC providers and coders.

	E/M Codes					
Category	99211	99212	99213	99214	99215	ASD
Providers	1.75	12.01	17.9	6.07	0.15	7.58
Coders	1.17	2.5	2.79	1.04	0	1.5

In conjunction with this study, an evaluation of coding data quality at NMCLPH was conducted. A sample of established-patient E/M coding data from 24 FPC providers was extracted from CHCS. The sample period was one year, from September 2000 to September 2001, and the sample size was 15,103 records. The number of records coded by each provider varied considerably, from a low of 14 to a high of 1,834. To achieve a valid comparison, the sample was divided into categories, 10 to 100, 101 to 1,000, and 1,001 to 2,000. There were eight providers in each of these categories.

Frequency distributions from NMCLPH providers are shown in Figures 11, 12, and 13. ASDs are shown in Figure 14. Variations in these distributions are consistent with those of providers in both the HPAS and TAMC studies. This provides evidence of poor coding data quality at NMCLPH. While the distributions from Providers K, O, R, and T are expected in a FPC, and those from Providers J, L, M, and N are also reasonable, the distributions from Providers F, G, I, and S are not only unlikely, but from a time-per-patient-visit perspective, are also impossible to achieve. In addition to marked inconsistency among these distributions, Providers A, F, and G provide excellent examples of up-coding.

Figure 11. Records from NMCLPH providers coding fewer than 100 encounters.

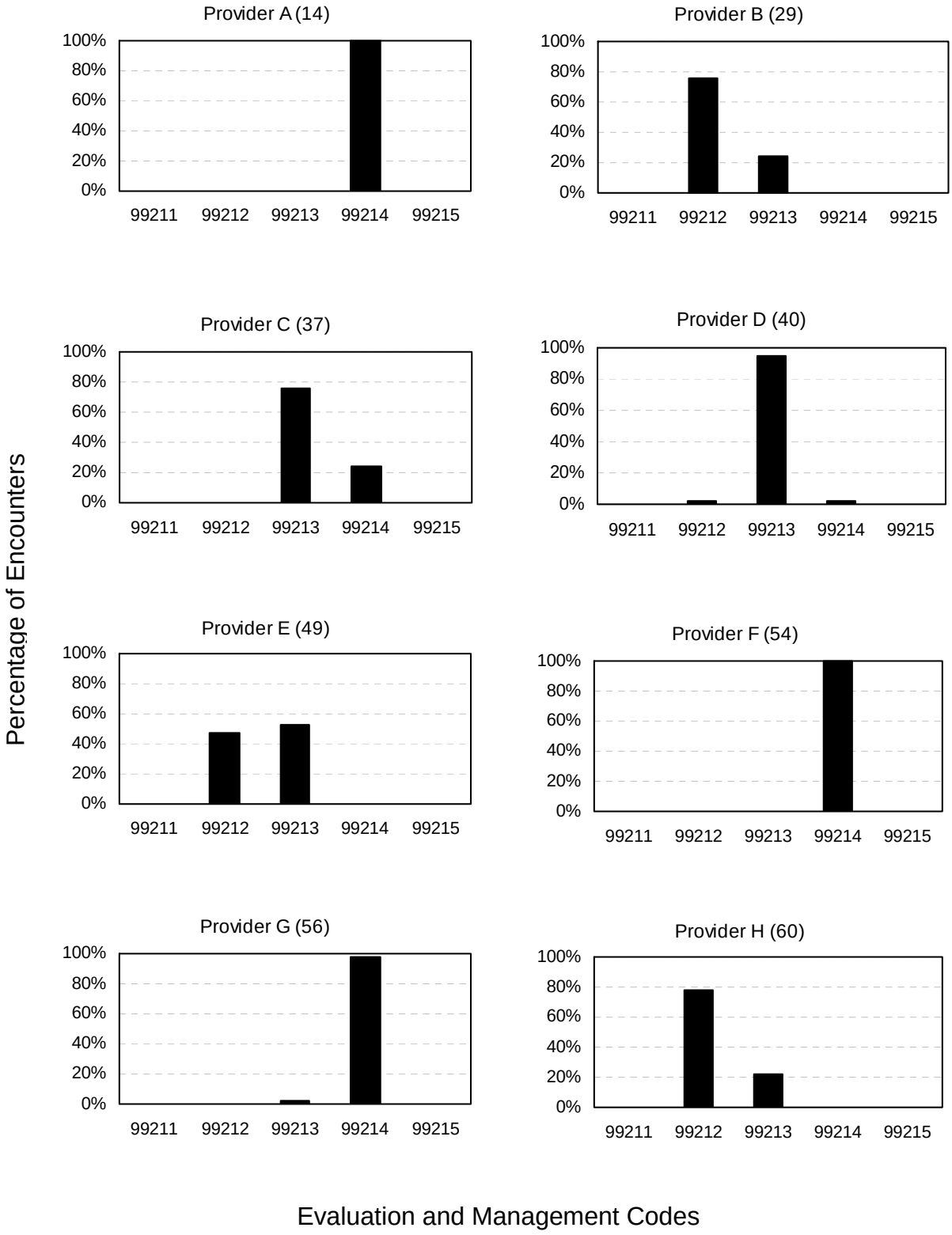


Figure 12. Records from NMCLPH providers coding between 101 and 1,000 encounters.

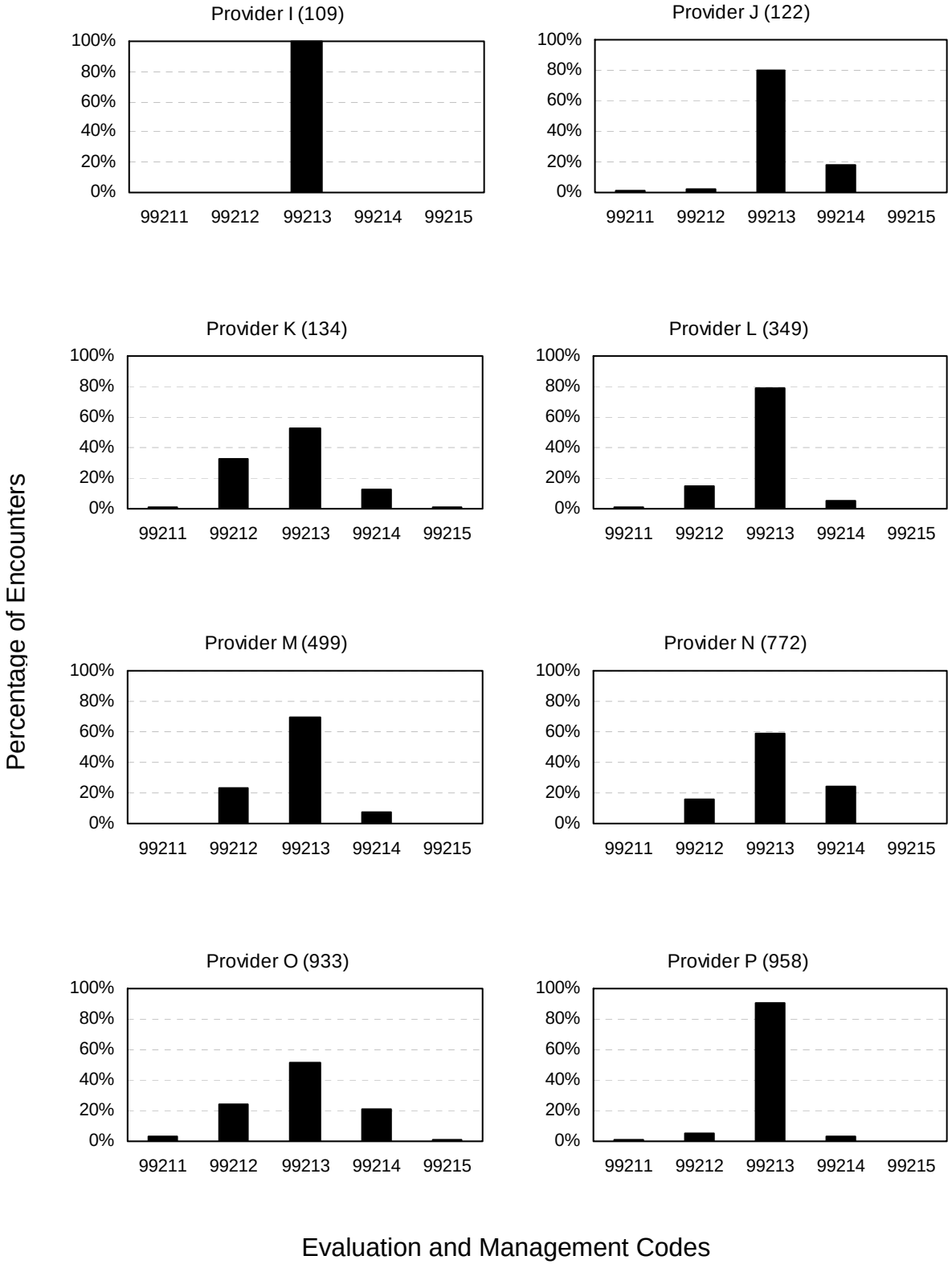


Figure 13. Records from NMCLPH providers coding between 1,001 and 2,000 encounters.

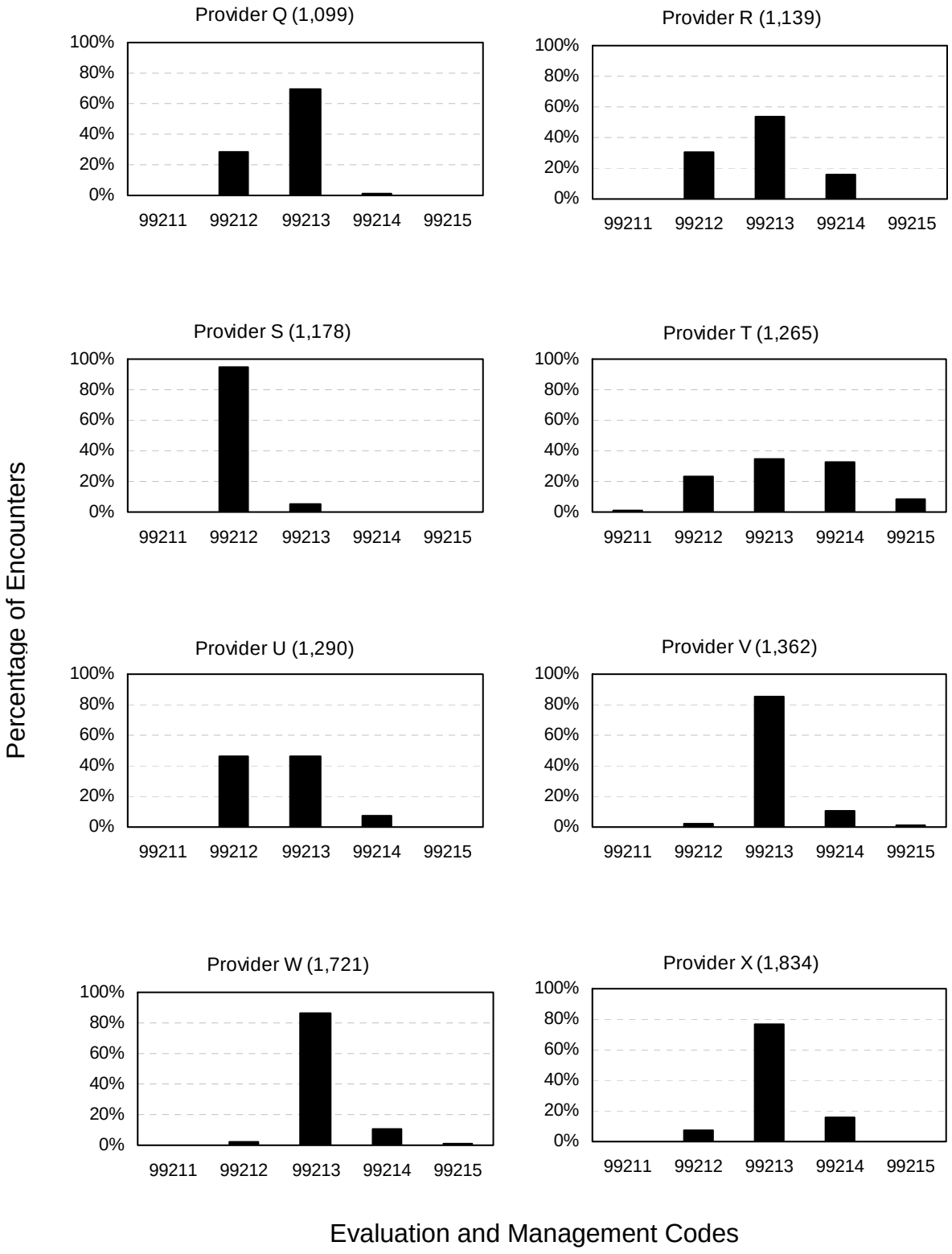


Figure 14. Comparison of ASDs of records coded by NMCLPH providers.

	E/M Codes					
Group	99211	99212	99213	99214	99215	ASD
10-100	0	35.69	36.68	49.34	0	24.34
101-1,000	1.06	11.76	17.92	8.88	1	8.04
1,001-2,000	0.51	30.58	28.16	10.19	2.9	14.47

Conclusion and Recommendations

From the evidence produced by this study, the recommendations to NMCLPH leadership would be to hire several professional coders and to implement a structured training program on coding application and procedures. Through an interesting turn of events, this recommendation was not necessary. As the study neared conclusion, the Chief, Bureau of Medicine and Surgery, implemented a plan to improve outpatient coding data quality. This initiative addressed numerous deficiencies reported via the Navy's Data Quality Control Program (Berry, 2002). In accordance with this plan, NMCLPH was directed to hire three certified professional coders by September 30, 2002. In conjunction with hiring coders, four physicians from NMCLPH received comprehensive training in ADM applications. These physicians will serve as champions for the ADM system, which is to be implemented Command-wide in October 2002. Additionally, introductory ADM training was administered to all providers throughout the Command.

Now that a concerted effort to improve coding data quality at NMCLPH is underway, this study will provide an excellent baseline to monitor progress. It will facilitate comparison of coding data quality produced by three distinct groups: certified professional coders; providers who have received in-depth ADM training; and providers who have received little or no formal ADM training. The results of this study will be extremely valuable to future data-quality improvement projects at NMCLPH.

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